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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/063,211	03/29/2002	Nishith Pramod Vora	120538	7086
6147	7590	06/30/2004	EXAMINER	
GENERAL ELECTRIC COMPANY GLOBAL RESEARCH PATENT DOCKET RM. BLDG. K1-4A59 SCHENECTADY, NY 12309			PARSONS, THOMAS H	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 06/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/063,211	VORA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Thomas H Parsons	1745	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 March 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities:

Page 4, line 11, suggest changing "contact layers 110" to --cathode layers 110--.

Appropriate correction is required.

### ***Drawings***

2. The drawings are objected to because:

Suggest changing reference sign "122" to --120--.

Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6 and 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Draper et al. (5,273,838) in view of Nishioka et al. (5,543,241).

**Claim 1:** Draper et al. in Figure 1 disclose a fuel cell comprising: a cathode layer (14) having a tubular shape; a contact layer (interconnection 20) electrically coupled to and disposed on the cathode layer (14) to leave an uncovered (discontinuous) cathode surface portion; an electrolyte layer (16) disposed on the uncovered cathode surface portion; and an anode layer (18) electrically isolated from contact layer. (See col. 2: 61-col. 4: 11)

Draper et al. do not disclose that the fuel cell has a polygon cross section.

Nishioka et al. in Figures 6-8 and 10-11 disclose a fuel cell having a polygon cross section. (See col. 8: 5-col. 9: 28; and col. 10: 13-27).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell of Draper et al. by incorporating a fuel cell having a polygon cross section as taught by Nishioka et al. because Nishioka et al. teach a fuel cell having a polygon cross section that would have provided a compact, high voltage generating fuel cell that can be of any configuration and have any electric connection

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desired thereby improving the overall flexibility and performance of the fuel cell generator. (See col. 2: 34-41; and, col. 4: 38-30).

**Claim 2:** The rejection is as set forth above wherein Nishioka et al. disclose a fuel cell whose polygonal cross section is hexagon. (See col. 8: 12-21).

**Claim 3:** The rejection is as set forth in claim 1 wherein Nishioka et al. disclose that that the polygonal cross section is equilateral.

**Claim 4:** The rejection is as set forth in claim 1 wherein Draper et al. in Figure 1 discloses two contact layers (20, 20') diametrically opposed, and Nishioki et al. disclose on col. 10: 13-27 a polygon fuel cell wherein two contacts can be disposed diametrically or on adjacent polygonal faces.

**Claim 5:** The rejection of claim 5 is as set forth above in claim 1.

**Claim 6:** The rejection of claim 6 is as set forth above in claim 4.

**Claim 13:** The rejection of claim 13 is as set forth above in claim 1.

**Claim 14:** The rejection of claim 14 is as set forth above in claim 2.

**Claim 15:** The rejection of claim 15 is as set forth above in claim 3.

**Claim 16:** The rejection of claim 16 is as set forth above in claim 4.

**Claim 17:** The rejection of claim 17 is as set forth above in claim 1.

**Claim 18:** The rejection of claim 18 is as set forth above in claim 4.

5. Claims 7-12 and 19-24 rejected under 35 U.S.C. 103(a) as being unpatentable over Draper et al. in view of Nishioka et al. and in view of Di Croce et al. (5,258,240).

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**Claim 7:** Draper et al. in Figures 1 and 2 disclose a fuel cell stack comprising: a plurality of fuel cells (12) comprising contact layers (20) and anode layers (18), and being adapted to be electrically coupled in parallel to satisfy a current requirement and in series to satisfy a voltage requirement. (See col. 1: 13-40; and col. 6: 12-21).

Draper et al. do not disclose that the fuel cell has a polygon cross section.

Nishioka et al. in Figures 6-8 and 10-11 disclose a fuel cell having a polygon cross section. (See col. 8: 5-col. 9: 28; and col. 10: 13-27).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell of Draper et al. by incorporating a fuel cell having a polygon cross section as taught by Nishioka et al. because Nishioka et al. teach a fuel cell having a polygon cross section that would have provided a compact, high voltage generating fuel cell that can be of any configuration and have any electric connection desired thereby improving the overall flexibility and performance of the fuel cell generator. (See col. 2: 34-41; and, col. 4: 38-30).

The Draper et al. combination does not disclose a cathode bus, an anode bus, and interconnection strips.

Di Croce et al. in Figures 2, 4 and 5 disclose a cathode bus (e.g. 68 as shown at the top of Figure 2) adapted to electrically couple contact layers; an anode bus (e.g. 68 as shown at the bottom of Figure 2) adapted to electrically couple the anode layers; and a plurality of interconnection strips (e.g. 60 and 66 as shown on Figure 2) adapted to electrically couple the fuel cells, the cathode bus, and the anode bus.

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell stack of the Draper et al. combination by incorporating the cathode bus, anode bus, and interconnection strips of Di Croce et al. because Di Croce et al. teach a fuel cell stack comprising an cathode bus, a anode bus, and interconnection strips that would have reduced the contact area between electrical conducting members and outer electrodes of the fuel cell so that the power densities are less sensible to their operating conditions, and improved the efficiency of heat transfer from interior portions of a stack to more efficiently conduct current and to relieve uneven thermal stresses thereby improving the overall life, efficiency and performance of the fuel cell.

**Claim 8:** The rejection is as set forth above wherein Nishioka et al. disclose a fuel cell whose polygonal cross section is hexagon. (See col. 8: 12-21).

**Claim 9:** The rejection is as set forth in claim 1 wherein Nishioka et al. disclose that that the polygonal cross section is equilateral.

**Claim 10:** The rejection is as set forth in claim 7 wherein Draper et al. in Figure 1 discloses two contact layers (20, 20') diametrically opposed, and Nishioki et al. disclose on col. 10: 13-27 a polygon fuel cell wherein two contacts can be disposed diametrically or on adjacent polygonal faces.

**Claim 11:** The rejection of claim 11 is as set forth above in claim 7.

**Claim 12:** The rejection of claim 12 is as set froth above in claim 10.

**Claim 19:** The rejection of claim 19 is as set forth above in claim 7.

**Claim 20:** The rejection of claim 20 is as set froth above in claim 8.

**Claim 21:** The rejection of claim 21 is as set forth above in claim 9.

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**Claim 22:** The rejection of claim 21 is as set forth above in claim 10.

**Claim 23:** The rejection of claim 23 is as set forth above in claim 7.

**Claim 24:** The rejection of claim 24 is as set forth above in claim 10.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H Parsons whose telephone number is (571) 272-1290. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas H Parsons  
Examiner  
Art Unit 1745

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Patrick Ryan  
Supervisory Patent Examiner  
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